

**(12) PATENT APPLICATION**  
**(19) AUSTRALIAN PATENT OFFICE**

**(11) Application No. AU 198782270 A1**  
**(10) Patent No. 610539**

**(54) Title**  
**Double acting rope tensioner**

**(51) International Patent Classification(s)**  
**F16G 011/10 F16G 011/12**

**(21) Application No: 198782270 (22) Date of Filing: 1987.12.09**

**(30) Priority Data**

**(31) Number (32) Date (33) Country**  
**PH9419 1986.12.10 AU**

**(43) Publication Journal Date: 1988.06.16**

**(44) Accepted Journal Date: 1991.05.23**

**(71) Applicant(s)**  
**Christopher Julian Brennan**

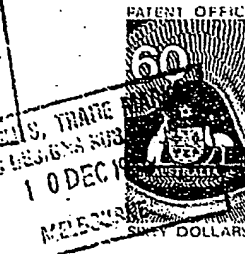
**(54) Inventor(s)**  
**Christopher Julian Brennan**

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Patents Act 1952

APPLICATION FOR A STANDARD PATENT  
OR A STANDARD PATENT OF ADDITION

610539



Insert full  
name(s) of  
applicant(s)

(71) I/we

CHRISTOPHER JULIAN BRENNAN

Insert address(es)  
of applicant(s)

of RSD 202, GLADYSDALE, VIC, 3797

Insert title  
of invention

(54) hereby apply for the grant of a ☒ standard patent for an invention entitled DOUBLE ACTING  
ROPE TENSIONER  
☐ patent of addition

(tick appropriate  
box)

which is described in the accompanying ☒ provisional specification.  
☐ complete

Insert name of  
actual inventor

(72) The actual inventor(s) of the said invention is/are CHRISTOPHER JULIAN  
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Insert address  
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(74) My/our address for service is

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Signature of  
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Australian  
attorney

TO

Chris Brennan  
(Signature)

THE COMMISSIONER OF PATENTS

This form must be accompanied by either a provisional specification (Form 9 and true copy) or by a complete specification (Form 10 and true copy).

In support of the Application made by CHRISTOPHER JULIAN  
BRENNAN

for a patent for an invention entitled DOUBLE ACTING ROPE  
TENSIONER

1. CHRISTOPHER JULIAN BRENNAN  
of RSP 202, GLADYSDALE VIC 3797

do solemnly and sincerely declare as follows:-

1. I am the applicant for the patent.

(or, in the case of an application by a body corporate)

1. ~~I am authorized by~~

~~the applicant for the patent to make this declaration on its behalf.~~

2. I am the actual inventor of the invention.

(or, where a person other than the inventor is the applicant)

2  
of \_\_\_\_\_ is the actual inventor of the invention and the  
facts upon which I am the \_\_\_\_\_ is entitled to make the application are as follows:-

Declared at MELBOURNE this TENTH day of DEC 1986

*(Signature of Declarant)*

**70 :**

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(12) PATENT ABRIDGMENT (11) Document No. AU-B-82270/87  
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 610539

(54) Title  
DOUBLE ACTING ROPE TENSIONER

International Patent Classification(s)  
(51) F16G 011/10 F16G 011/12

(21) Application No. : 82270/87 (22) Application Date : 10.12.86

(23) Filing Date of Complete Specification : 09.12.87

(43) Publication Date : 16.06.88

(44) Publication Date of Accepted Application : 23.05.91

(60) Related to Provisional(s) : PH9419

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(56) Prior Art Documents  
AU 407745 66003/65 58.1 78.2 78.9

(57) Claim

1. A line tensioning device comprising a rigid body defining two substantially parallel grooves, each said groove being open at a side of the body, being open at each end and having opposed internal surfaces which converge towards the bottom of the groove and have ridges on each face, the ridges on both faces of each groove being inclined to the bottom of the groove upwardly from one end of the groove, whereby a common line can be secured in both grooves to define a loop in the line therebetween which may be passed around an anchoring point, and wherein the one end of a first of the grooves and the one end of the second of the grooves open towards a common end of the rigid body and a rounded guide surface is located intermediate said common end of the rigid body and said one end of one of the grooves to guide a portion of the line from adjacent the opposite end of the body along the side of the body opposite to that on which said one of the grooves opens to said one end of said one of the grooves.

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PATENTS ACT 1952

COMPLETE SPECIFICATION

610539

(Original)

FOR OFFICE USE

Class

Int. Class

Application Number:  
Lodged:

Complete Specification Lodged:  
Accepted:  
Published:

Priority:

Related Art:

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1 Little Collins Street, Melbourne, 3000.

Complete specification for the invention entitled:

"DOUBLE ACTING ROPE TENSIONER"

The following statement is a full description of this invention,  
including the best method of performing it known to me :-

## DOUBLE-ACTING ROPE TENSIONER

The present invention relates to a line tensioning device such as may be used to tie down cargo during transport aboard a ship, truck or other means of transportation.

5

It is well known for loads being transported to be tied down using a rope or other line; the free end of which is looped around an anchoring point and tension applied before tying it off. It is also known to facilitate the application of tension by forming a ~~sheershank~~ <sup>sheepshank</sup> knot in the rope above the anchoring point so as to form a small loop, and then pass the free end around the anchoring point and back through the small loop so as to provide an increased mechanical advantage when the rope is tensioned. A problem with this arrangement is that the sheershank must be tied in the rope each time a load is secured since its

10

15



position in the rope is dependent on the size of the load. Furthermore, a substantial amount of friction is developed between the engaging portions of the rope as the free end passes through the small loop,  
5 thus potentially increasing the difficulty of applying a satisfactory tension to the rope and tending to cause the rope to fray.

10 An alternative to the use of a sheepshank knot to facilitate the application of tension to a tie-down rope is disclosed in U.S. Patent Specification 4120077 in which the tensioning device has a separate line secured thereto, the separate line passing back through the body of the device to form a loop and  
15 then engaging a jamming cleat on the body to fix the length of the loop. A hook is provided on the body of the device to engage the anchoring point and another hook is provided on the loop of the separate line to engage a loop in the tie-down rope. A  
20 disadvantage of this device is, again, that a knot must be tied in the tie-down rope to form the loop therein and that the position of the loop may need to be adjusted according to the size of the load.

25 It is an object of the present invention to provide a line tensioning device which alleviates the disadvantages of the prior proposal.

30 According to the present invention there is provided a line tensioning device comprising a rigid body defining two substantially parallel grooves, each said groove being open at ~~one~~<sup>2</sup> side of the body, being open at each end and having opposed internal surfaces which converge towards the bottom of the groove and



have ridges on each face, the ridges on both faces of each groove being inclined to the bottom of the groove upwardly from one end of the groove, whereby a common line can be secured in both grooves to define a loop in the line therebetween which may be passed around an anchoring point, and wherein the one end of a first of the grooves and the one end of the second of the grooves open towards a common end of the rigid body and a rounded guide surface is located intermediate said common end of the rigid body and said one end of one of the grooves to guide a portion of the line from adjacent the opposite end of the body along the side of the body opposite to that on which said one of the grooves opens to said one end of said one of the grooves.

By the present invention, the line tensioning device can be secured at any given point along the line by the use of one of the ridged grooves and without the use of any knots at all within the actual device. The free end of the line may then be passed around the anchoring point on the means of transport to form a loop and the free end secured after tension is applied in the second ridged groove. Advantageously, there may be no necessity to thread either end of the line through a hole or passage of the device so that the line may be very readily secured.

The two grooves may be substantially identical and the advantage of the grooves defined is that tension in the line forces the secured portion of the line deeper into the groove. Grooves of the type defined are commonly known as jamming cleats and individually are well known in, for example, the sailing field, being described in Australian Patent Specification 407745, U.S. Patent Specification 3574900 and, Australian Patent Specification 517872. The latter specification describes





a modification of the basic jamming cleat in which the bottom ends of the opposed grooves diverge towards the one end of the groove, but this modification is not an essential feature of the line tensioning device of the present invention. There are no moving parts in the jamming cleats described in the aforementioned patent specifications and, similarly, the line tensioning device of the present invention may advantageously include no moving parts.

10 The arrangement of the two grooves in the rigid body permits a variety of ways of securing a line in one of the grooves before forming a loop and securing it in the second groove. Thus, the secured line may be introduced  
15 into the first groove by first passing the line from the opposite end of the body around the guide surface of the rigid body and then into the first groove effectively from the common end of the body. The guide surface may extend at least partway along the side of the rigid body  
20 opposite to said side at which the first groove is open. After securing the line in the first groove, it will then be necessary for it to pass back around the rigid body to form the loop prior to engagement directly with the second groove.

25 Alternatively, in a preferred embodiment, the secured line is passed directly into a first groove from the end of that groove nearest the location at which the line is secured and directly out of the opposite end to form the  
30 loop. Conveniently, then, means is provided to limit the ease of disengagement of the line from the first groove and, in the preferred embodiment, such means comprises a hook portion, which may be integrally formed with the body, upstream of the entry end of the first groove. The  
35 second groove may then be arranged to receive the free end of the line indirectly to complete the loop by



passing the free end of the line around the guide surface of the body to increase the mechanical advantage. The guide surface may extend at least partway along the side of the body opposite to that on which the second groove  
5 opens.

Advantageously, the mechanical advantage of the line tensioning device of the invention may be further increased by effectively providing a block or pulley  
10 surface, for example a curved channel which may be provided on the rigid body and is conveniently open, around which the free end of the line forming the first loop may be passed and returned to the anchoring point to form a second loop, the free end of which is received  
15 directly or indirectly by the second groove essentially in the manner described above. The curved channel may conveniently be formed in a protuberance formed integrally with the body.

20 The line tensioning device may be formed in, for example, wood integrally or with the two jamming cleats defining the grooves being secured together. However, most preferably the rigid body is moulded as one piece with no moving parts in a suitable engineering plastics material.  
25 Clearly, it is advantageous to have any of the aforementioned guide surfaces and a curved channel formed as smooth as possible so as to minimize frictional resistance when tensioning the line.



The grooves are preferably arranged to open on a common side of the body and to extend in respective substantially parallel planes. The grooves may be off set so that one extends more towards one end of the rigid body than the other.

One embodiment of a line tensioning device in accordance with the present invention will now be described by way of example only with reference to the accompanying drawings, in which

- Figure 1 is a top plan view of the device;
- Figure 2 is a bottom plan view of the device;
- Figure 3 is an end plan view of the device;
- Figure 4 is the other end plan view of the device;
- Figure 5 is a sectional view on the line V-V of Figure 1 showing a modified side wall;
- Figure 6 is a perspective view of the device from above;
- Figure 7 is a perspective view of the device from below;
- Figure 8 is a view similar to Figure 6 showing a first manner of use of the device; and
- Figure 9 is a view similar to Figure 8 but showing a second manner of use of the device;

The line tensioning device 10 shown in the drawings comprises a rigid body 12 moulded in engineering plastics material such as a polyamide which is of a size conveniently able to fit into one hand, with no moving parts. The overall shape of the rigid body is generally rectangular with a first end 14, a second end 16, a top edge 18 a bottom edge 20, a first side 22 and a second side 24.

The rigid body 12 primarily comprises a first jamming cleat 26 and second jamming cleat 28 which have a common wall 30 extending the length of the rigid body.

5 The first and second jamming cleats 26 and 28 define  
respective line receiving grooves 32 and 34 which  
extend in substantially parallel planes, are each  
open at the top side 18 of the body 12 and are each  
open at both ends. The jamming cleat 26 includes the  
10 central wall 30 and a side wall 36 forming the first  
side 22 of the body while the jamming cleat 28  
includes the central wall 30 and opposed side wall 38  
forming the second side 24 of the body.

15 Each of the jamming cleats is of a well known type  
such as is described in U.S. Patent Specification  
3574900 so that the grooves 32 and 34 are defined by  
opposed internal surfaces of the respective walls  
36, 30 and 38 which converge towards the bottoms 40  
and 42 of the grooves, respectively, and have  
20 associated pairs of arrays 44 and 46 of ridges formed  
on each surface. The arrays 44 and 46 of ridges are  
inclined to the bottoms of the grooves upwardly from  
respective first ends 48 and 50 of the grooves, which  
first ends are both closest to the first end 14 of  
25 the body. The internal surfaces of the grooves 32  
and 34 are shown uniformly spaced along the length of  
the grooves but may, if desired, taper slightly  
outwardly from the first ends 48 and 50.

30 The jamming cleats 26 and 28 are relatively offset so  
that the cleat 26 is closer to the first end 14 of  
the body while the jamming cleat 28 is closer to the

second end 16 of the body. It will be appreciated that the first ends 48 and 50 of the grooves 32 and 34 defines the entry end for a securing line since tension applied to the securing line away from the respective groove at the first end will, by virtue of the inclined arrays 44 and 46 of ridges, tend to draw the securing line deeper into the groove to be held more securely.

In addition to the two jamming cleats 26 and 28, the line tensioning device 10 includes various means for guiding the securing line. As will be described in more detail hereinafter, the secured line is first received in the jamming cleat 26 from the entry end 48 and a hook 52 is provided at the end 14 of the body 12 to guide the line into the groove 32 and to reduce the likelihood of the line being accidentally withdrawn from the groove. The hook 52 defines a passage 54 for the line and is open downwardly, relative to the groove 32, so as to avoid the need to thread the line through the passage 54. Thus, it is merely necessary to pass the line transversely through the gap 56 in order to locate it in the passage 54. The hook 52 is formed essentially as an extension of the central wall 30 which extends upwardly and outwardly from immediately above the level of the bottom 40 of groove 32 and then downwardly to define the passage 54 with a nose 58 which is sculptured to reduce material where strength is not required. The passage 54 is substantially in line with the groove 32.

Also in line with but slightly below the bottom 40 of the groove 32, and at the second end 16 of the rigid

body is a protuberance 60 which extends integrally from the central wall 30 adjacent the bottom edge 20. The protuberance 60 has a curved open channel 62 formed on its upper, inner and lower surfaces to receive or partly receive the securing line.

The protuberance 60 is spaced from an outlet end 64 of the groove 32 by a sufficient distance to permit the securing line to pass therebetween, and formed beneath the outlet end 64 of the groove 32 is a first guide channel 66 which extends from that position across the bottom edge 20 of the body to the opposite side of the body and curves around at 65 to open into the entry end 50 of the jamming cleat 28. A projection 67 separates the open channel 62 around the protuberance 60 from the first guide channel 66. The curved portion 65 of the first guide channel 66 is defined by a flange 68 of the body. The first guide channel 66 extends generally into the groove 34 of the jamming cleat 28 at the entry end 50 but also merges at 69 with a second, linear guide channel 70 also formed on the bottom edge 20 of the body and extending wholly beneath the jamming cleat 28 from the second end 16 of the body.

While the walls 36, 30 and 38 of the body 12 are generally substantially rigid, it has been found advantageous to provide at least one of the side walls 36 and 38 with a degree of resilience so that while it is still sufficiently rigid to satisfactorily secure the line, it may more satisfactorily spread the load of the secured line along the length of the wall. Furthermore, while the outer surfaces of the side walls 36 and 38 will

generally be parallel with each other, one or both may be kinked outwardly slightly as shown in the sectional view of figure 5 which for convenience does not illustrate the array 46 of ridges in jamming cleat 28.

As shown in figures 8 and 9, the line tensioning device 10 may be used in either of two manners. In a first manner of use shown in figure 8 the line 71 is first secured to a fixed point at its end 72, for example by means of a knot. The fixed point may be on a load to be secured or may be on the transport means such as a truck in which case the line will then be passed over the load. Alternatively, the line 71 may be secured to a tarpaulin or other cover (not shown) which also is tensioned as the line 71 is tensioned.

The free end of the line 71 is then passed through the gap 56 into the passage 54 of the hook 52 and the tensioning device 10 is secured on the line 71 at the desired location by jamming the line into the groove 32 of the jamming cleat 26. The resulting free end of the line 71 is then passed around an anchoring point 76 such as a bar or hook to form a loop 78. The free end of the loop 78 is returned to the tensioning device 10 and passed along the open channel 62 in the upper surface of the protuberance 60, between the protuberance 60 and the outlet end 64 of the groove 32 into the first guide channel 66 and around at 65 into the groove 34 of the jamming cleat 28 from the entry end 50. The line is tensioned by pulling on the free end 74 of the line exiting from the jamming cleat 28 in a slightly upwards direction

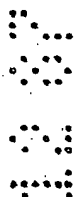
so as to release the line therefrom as a result of which the device 10, and particularly the curved portion 65 of the first guide channel 66, acts as a single pulley block to facilitate tensioning of the line between the fixed point and the anchoring point 76. As the line 71 is tensioned, the device 10 is displaced with it towards the anchoring point 76 by virtue of the engagement between the line and the jamming cleat 26. When the required tension is achieved, the free end 74 of the line is secured in the jamming cleat 28 by pulling relatively downwardly. If insufficient tension is achievable in this manner, the arrangement proposed in figure 9 may be utilised.

As the device is used in figure 9 it acts as a double pulley block with two loops extending around the anchoring point 76. The first loop 78 is formed in exactly the manner described with reference to figure 8 but instead of passing the free end of the line into the first guide channel 66 from the open channel 62 in the upper surface of the protuberance 60, it is passed back along the full length of the open channel 62, that is additionally along the inner and lower surfaces of the protuberance 60 and back to the attachment point 76 around which it is turned to form a second loop 80. The free end of the loop 80 is returned to the device 10 along the second guide channel 70 which merges at 69 with the curved portion 65 to guide the line into the groove 34 of jamming cleat 28 in the manner described with reference to figure 8.

As described, the device 10 has no moving parts and



no apertures through which the line must be threaded and, particularly if formed in a low friction material such as oil bearing polyamide, provides ready tensioning of a line without being secured to the line with knots. The device 10 is described by way of example only and it will be appreciated by those skilled in the art that many modifications may be made to it within the scope of the present invention as defined by the appended claims.



**CLAIMS**

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A line tensioning device comprising a rigid body defining two substantially parallel grooves, each said groove being open at a side of the body, being open at each end and having opposed internal surfaces which converge towards the bottom of the groove and have ridges on each face, the ridges on both faces of each groove being inclined to the bottom of the groove upwardly from one end of the groove, whereby a common line can be secured in both grooves to define a loop in the line therebetween which may be passed around an anchoring point, and wherein the one end of a first of the grooves and the one end of the second of the grooves open towards a common end of the rigid body and a rounded guide surface is located intermediate said common end of the rigid body and said one end of one of the grooves to guide a portion of the line from adjacent the opposite end of the body along the side of the body opposite to that on which said one of the grooves opens to said one end of said one of the grooves.
2. A device according to Claim 1 wherein the grooves open on a common side of the body.
3. A device according to Claim 1 or Claim 2 wherein the grooves extend in respective substantially parallel planes.
4. A device according to any one of the preceding claims which includes means under which the line is capable of passing to limit the ease of disengagement of the line from one of the grooves.
5. A device according to Claim 4 wherein the limiting means is integrally formed with the body.



6. A device according to any one of the preceding claims which includes a curved channel along which the common line may be passed between engaging the first and second grooves to define two loops extending respectively from the first groove and to the second groove, whereby both loops may be passed around the anchoring point.

7. A device according to Claim 6 wherein the curved channel is formed in a protuberance which is integrally formed with the body.

8. A device according to any one of the preceding claims wherein at least one of the internal surfaces of the grooves is formed in a wall of the body having a degree of resilience.

9. A line tensioning device substantially as herein described with reference to the accompanying drawings.

DATED this 19th day of December, 1990.

CHRISTOPHER JULIAN BRENNAN

By his Patent Attorneys

DAVIES & COLLISON



**DRAWINGS**

9 1 2 3 4 5 6 7 8 9

82 270/87

FIG 1

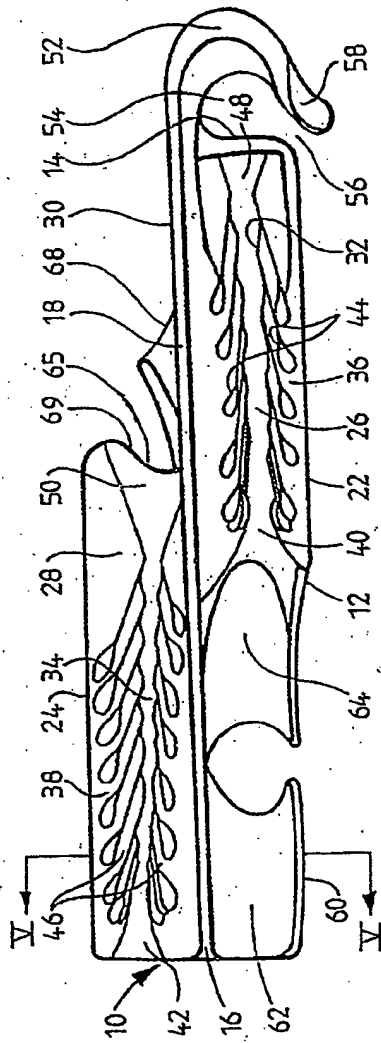
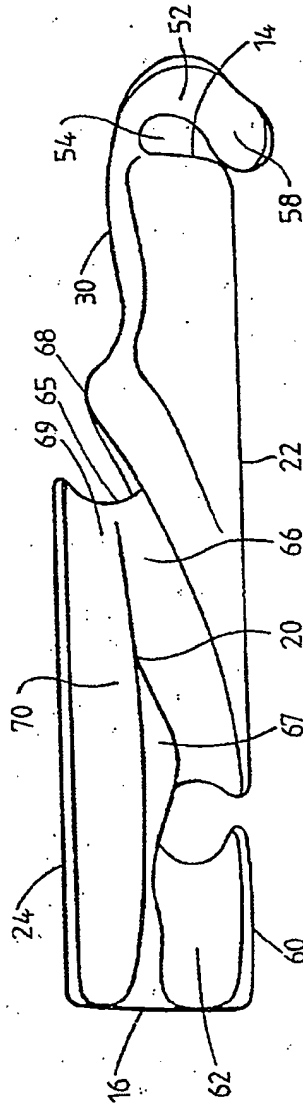


FIG 2



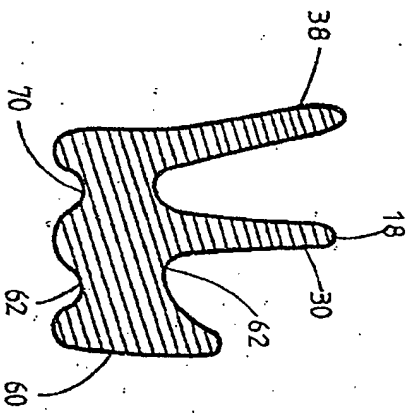


FIG. 5

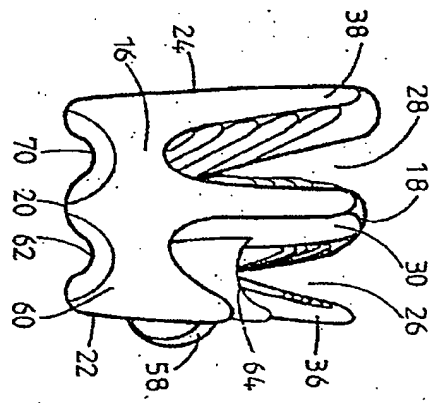


FIG. 3

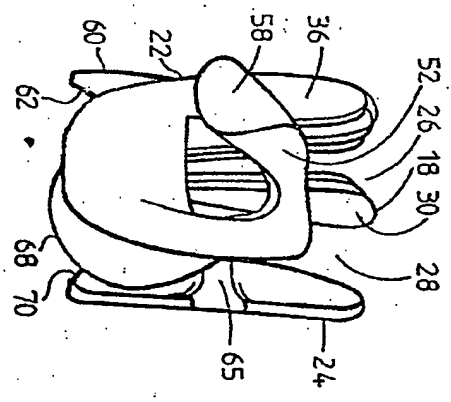
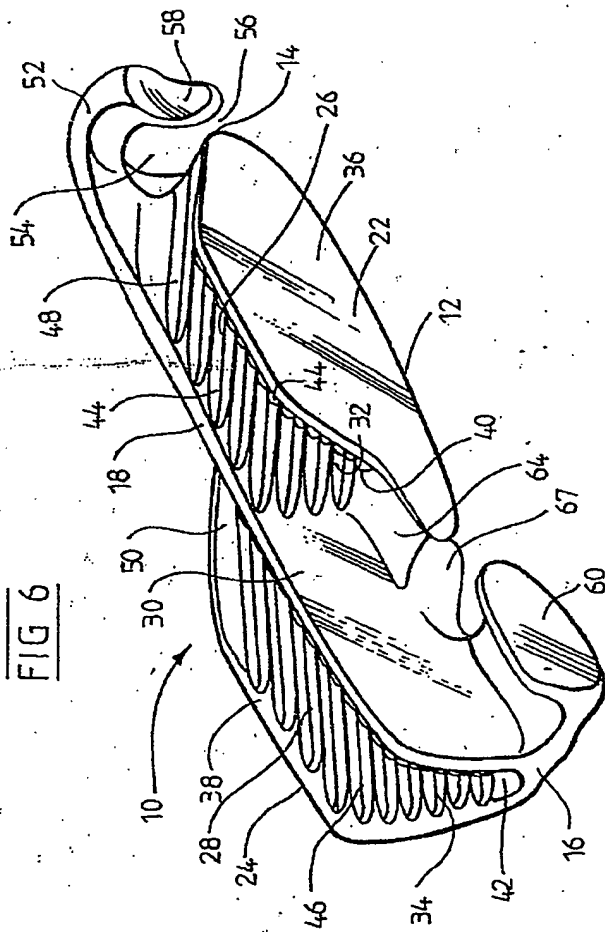


FIG. 4

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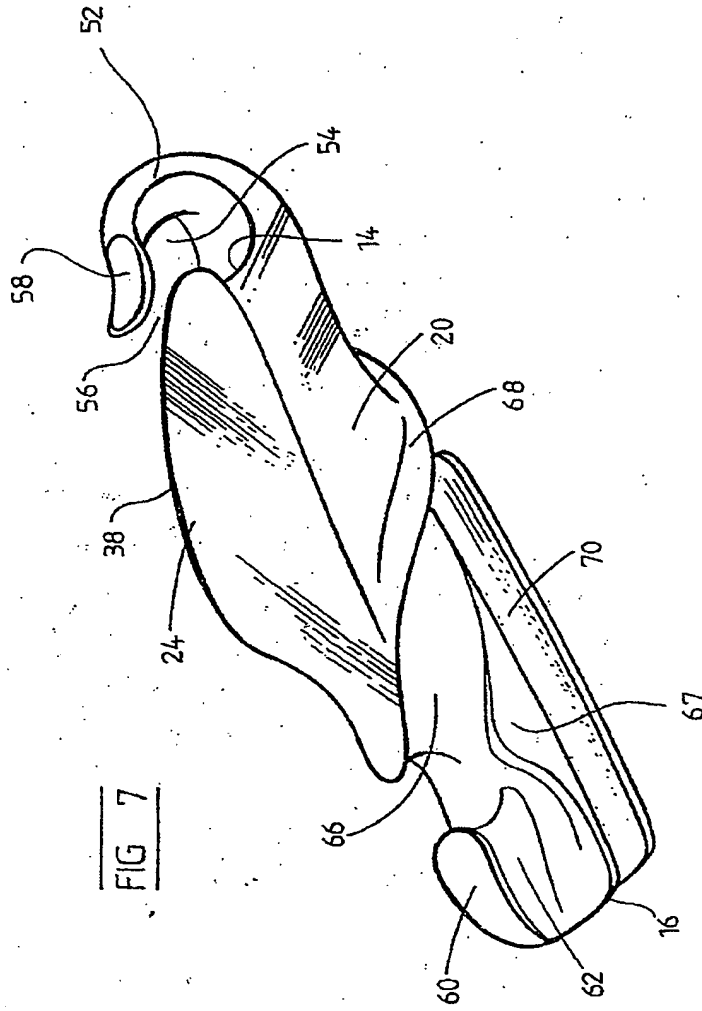
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FIG 6





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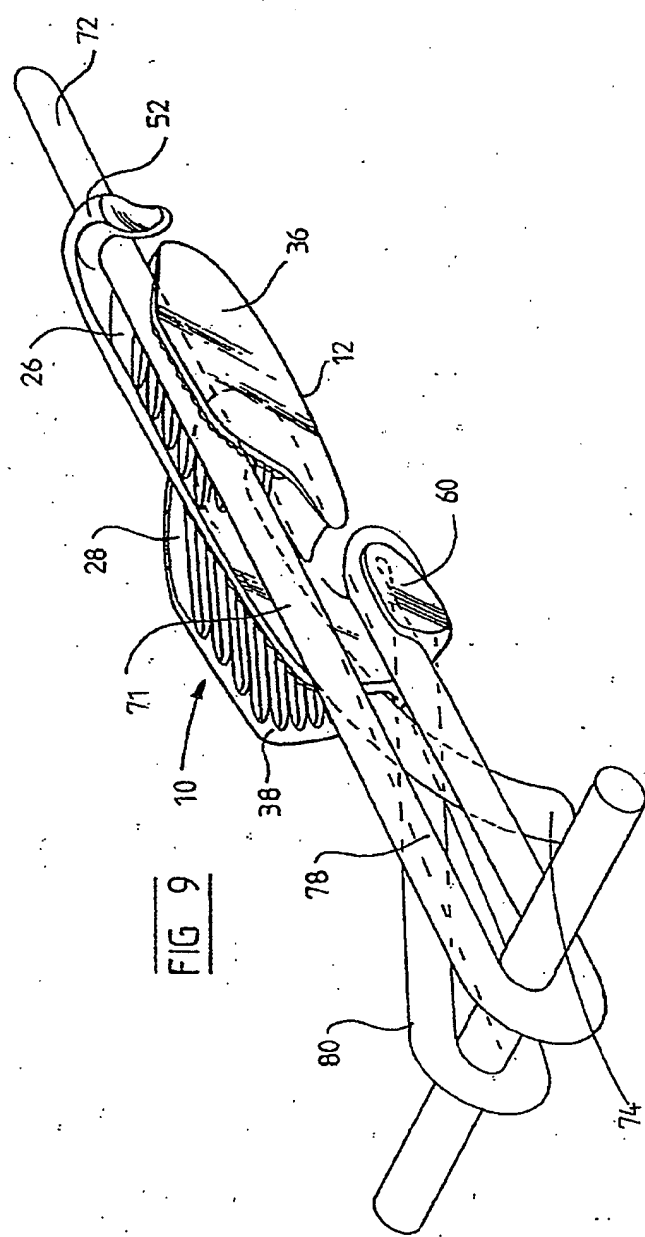


FIG 9

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